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Barry Sutton
Clark Hill PLC
151 S. Old Woodward Suite 200
Birmingham, MI 48009

RE: Snyder v Bass Pro

Dear Mr. Sutton:

This letter summarizes results of the investigation carried out to date in the above-referenced litigation. The following sections provide descriptions of the accident, review the injuries to the plaintiff, and present the analysis of the accident. My opinions are stated to a reasonable degree of engineering and medical certainty. My education, experience and training relative to the opinions set forth in this report are outlined in my curriculum vitae, which is attached to this report. Testimony history and rate schedules are also attached as appendices.

Materials Received and Reviewed

The list contained in Appendix A describes materials that were received from your office and subsequently reviewed. The bibliography includes technical literature reviewed in conjunction with this matter.

Accident Description

The following accident description is a synopsis based on the Plaintiff's Amended Complaint and the deposition of David Snyder. On November 16th, 2013, Mr. Snyder was using an API Outdoors tree stand while hunting in the Davy Crockett National Forest. At some point, the tree stand chain separated, causing Mr. Snyder to fall 19 feet to the ground. He was not wearing the provided safety harness or any other full body harness.

Review of Fact Witness Information

David Snyder: Deposition taken March 1st, 2017

- Role: Plaintiff
- Mr. Snyder was not using a safety harness at the time of the subject accident (26).
- He would not wear safety harnesses due to fear of "suspension death" (64).
- "... I felt my chances of survival of stand failure of me hitting the ground would be greater than that of the stand breaking and me getting knocked out unconscious... (66-67).

- He agreed that he made an intentional decision based on personal research to not follow the expressed instructions of the tree stand manufacturer by not wearing the harness (73).
- He was sitting, reading a book, when he heard a loud noise. "... the chain popped." He fell to the ground and landed on his right shoulder (160).
- After 45 minutes, he heard his phone vibrate, and he was able to call for help. He did not remember how long it took him to be found, but he never lost consciousness (163-167).
- He was 5'11" and weighed 194-202 pounds at the time of the accident (173).
- His legs were tucked underneath his chair when it broke, causing him to somersault over the front edge (181-182).
- He initially landed on his right shoulder followed by his right side/rib cage (183-184).
- He is currently paralyzed from the belly button down (194).

Discussion

Falls from Height

An object free-falling 19 feet from rest will have a vertical impact velocity of approximately 24 mph. Considering Mr. Snyder somersaulted forward as he began his fall, his impact velocity was even greater given the additive effect of this initial rotation.

Falls from height pose a serious injury risk and are a prominent cause of accidental death. Atanasijevic (2005) *et.al.* studied 660 fatal falls from height over a 20-year period. Nearly 46% of these fatalities occurred at heights from 7 meters or less (19 feet \approx 5.8 meters). In falls from heights similar to that of the subject accident (4-7 meters), 77% resulted in head injuries, 61% in chest injuries, and 21% in abdominal injuries.

Helling (1999) *et.al.* observed 176 subjects, a majority of whom were under 50 years old, who sustained falls from height from less than 20 feet. They found that 81 (35%) sustained head injuries and 49 (22%) sustained spinal fractures or cord injuries, including 9 quadriplegics and 5 paraplegics. There were 7 (8%) fatalities.

Mason (1993) *et.al.* studied injuries in the construction industry over a two-year period. Out of 18,693 reported injuries, 3,241 (17%) were due to falls. 1137 (35%) of the falls were considered major, and 46 (1.4%) were fatal. Falls resulted in the most major injuries and fatalities.

Falls from height represent the most common mechanism of injury while hunting, having a higher incidence than even gunshot wounds (Crockett 2010, Shields 2011, Halanski 2008). Specifically, falls from tree stands pose the greatest injury risk to hunters. Terry (2010) *et. al.* performed a study of tree stand related injuries from 2000-2007. They reported that "a common source of tree-stand related injuries are falls that can be partly attributed to the failure to appropriately use safety harnesses, . . ." They stressed the importance of proper education and utilization of these harnesses. They did not mention any instances of suspension trauma or comment on the phenomenon.

Crites (1997) *et. al.* studied spinal injuries in 27 subjects who fell from a tree stand. The average fall height was 19.6 feet, ranging from 10 to 35 feet. All but one sustained at least one spinal fracture. The one exception suffered jumped-locked facets and was rendered quadriplegic. They

found that 44% of the falls resulted permanent neurologic deficits with paraplegia being the most common. Nearly 60% of the subjects sustained other injuries in addition to their spinal injuries. There were no findings of suspension trauma.

Similarly, Carroll (2016) *et. al.* examined 193 patients involved in tree stand falls who were admitted to a trauma center. In this study, 32% suffered spinal injuries with three fatalities. Only four of the subjects were wearing a safety harness. The authors stressed the necessity for safety harnesses and the need for better hunter education. Again, there were no findings of suspension trauma.

Other studies have found analogous results with an absence of suspension trauma (Pierre 2014, Metz 2004, Crockett 2010). Each study found that the incidence of spinal fracture from tree stand falls were over 50% with three of the 51 subjects in the Metz study suffering fatal injuries.

Suspension Trauma

Lee (2007) *et. al.* defined suspension trauma as the natural physiological response to the human body being held motionless in a vertical position for a period of time, resulting in presyncopal symptoms or loss of consciousness.

Whereas suspension trauma is a reported medical phenomenon, it's occurrence is scarcely documented in literature. Pasquier (2011) *et. al.* conducted a literature review on the phenomenon and found a "paucity of scientific data," which was limited to case studies and a few human experimental prospective studies. They concluded that although a risk of death from suspension trauma does exist, it was likely very small. He also stressed the importance of using a harness and not acting alone when undertaking suspension activities.

Seddon (2002) studied the prevalence of suspension trauma in a normal working environment. He found that during a 9-year period over 5.8 million recorded hours spent "on rope" by members of the Industrial Rope Access Trade Association (IRATA), there was not a single instance of symptoms of suspension trauma (pre-syncope or syncope). Documented cases of suspension trauma have occurred during certain activities that use a body harness system, including mountaineering, spelunking, and parachuting. Instances where suspension trauma have occurred were frequently attributed to user inexperience or extreme conditions, such as rappelling a waterfall or climbing an alpine peak (Pasquier 2011, Mortimer 2011, Wharton 2011, Roeggla 1996). Mortimer and Wharton both stressed that remaining suspended on a rope is preferable to falling, despite the risks of suspension trauma.

Suspension trauma in a hunting environment is nearly non-existent. Shields (2011) *et.al.* studied the literature on tree stand-related injuries. They found that falls from tree stands were the leading cause of hunting related accidents. Other comprehensive studies they presented documented 426 accidents involving falls from tree stands, including 29 fatalities. They encountered only two cases of tree stand-related deaths related to asphyxiation (not suspension trauma). One involved a 14-year-old boy wearing an improperly fitted safety harness that compressed too tightly around his waist, and the other involved an individual falling from a tree while wearing a "belt-type" harness, which slid up around his neck. The authors emphasized the importance of proper safety harness usage at all times when using tree stands and warned against

hunting in complete isolation. Both fatalities would most likely have been prevented with proper safety harness use.

Shields also presented two case studies involving tree stand related fatalities. One involved a 65-year-old man found hanging upside down from a homemade tree stand. He was not wearing a full body harness. His legs were discovered suspended by a nylon-webbed rope around his waist extending from the stand. His death was attributed to positional asphyxia not suspension trauma. The other involved another 65-year-old man who was found dead under a tree. He had fallen approximately 20 feet from a homemade tree stand. His death was attributed to truncal blunt force trauma. In neither case was the individual wearing a safety harness. The first case shows that suspension trauma, despite its rarity, is possible even while unharnessed.

The Crites, Carroll, and Shields studies together documented at least 646 cases of traumatic falls from tree stands with 32 fatalities. After a thorough review of the literature, there were only three documented cases of death sustained while wearing a harness (all from Shields). In two of the cases, the subject was either wearing an inappropriately sized harness or not wearing a harness at all. Nonetheless, sustaining an injury from a fall from a tree stand was over 200 times more prevalent in the literature than suffering fatal injury while wearing a harness. Suffering a fatal injury while wearing a harness was also over 10 times more prevalent.

The evidence is compelling: the risk of suspension trauma, especially related to hunting from a tree stand, is infinitesimal. Conversely, the risk of falling from height when using a tree stand without a harness is substantial, and not surprisingly, leads to the most hunting injuries. Clearly, the risk of a fall from height markedly outweighs the risk of sustaining suspension trauma.

Opinions

1. The injury and fatality risk of a fall from height while hunting in a tree stand is exponentially greater than the risk of suspension trauma.
2. Hunters should always wear their full body safety harness while using a treestand.

Please note that this report is based upon information available to me at the time of its preparation. I understand that discovery is still ongoing. Should substantial additional information that affects the contents of this report become available, an amended or supplementary report may be prepared.

If you have any questions, do not hesitate to contact me.

Sincerely,



Elizabeth H. Raphael, M.D., F.A.C.E.P.

Appendix A: Materials Received and Reviewed

Legal Documents

- Plaintiff's Amended Complaint

Fact Witness Statements and Depositions

- David Snyder, dated March 1st, 2017

Expert Witness Reports

- Stephen Pustilnik, dated April 18th, 2017

Bibliography

Falls from Height

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Suspension Trauma

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